

THE UNIVERSITY OF MANCHESTER
PARTICULARS OF APPOINTMENT
FACULTY OF SCIENCE & ENGINEERING
SCHOOL OF ENGINEERING
DEPARTMENT OF CHEMICAL ENGINEERING AND ANALYTICAL SCIENCE
RESEARCH ASSOCIATE IN GAS-SOLID REACTORS APPLIED TO STEEL INDUSTRY
VACANCY REF: S&E-15394

Salary:	£32,816 to £40,322 per annum, depending on relevant experience
Hours:	Full Time
Duration:	Fixed Term, from 1 April 2020 until 31 March 2022
Location:	Sackville Street, Manchester

Enquiries about the vacancy, shortlisting and interviews:

Contact: Dr Vincenzo Spallina

Email: vincenzo.spallina@manchester.ac.uk

Background

Advanced energy and chemical plants require new reactors and processes designed to combine high efficiency, attractive economics and reduced pollutant emissions. A possible solution to intensify the process is the combination of reaction and separation in a single unit operation. A **gas-solid** reactor consists of a bed filled with particles which react if exposed in a certain environment and afterward they are regenerated. Several very promising processes proposed for near-zero emissions from industry such as *chemical looping* and calcium looping *technologies* are based on gas solid reactions. Most of these processes occur at high temperature and pressure, and often combine exothermic and endothermic reactions so that the proper integration will become essential to achieve high efficiency with near-zero emissions.

The key objectives of BREIN-STORM project (Boosting Reduction of Energy Intensity in clean Steelworks platform) and H2020-C4U (Advanced Carbon Capture for steel industries integrated in CCUS Clusters) is the development of a new process integrating calcium looping (CaL) and chemical looping combustion (CLC) with the aim of reducing the energy demand, carbon footprint and other life cycle environmental impacts as well as costs in the steel sector. The two projects are currently focusing on the scale-up of the technology, its integration and overall techno-economic and environmental assessment. The two projects are carried in partnership with several universities, research centres and industries of UK and Europe.

Overall Purpose of the Job

We are seeking to recruit a Research Associate to work under the supervision of Dr. Vincenzo Spallina in the School of Chemical Engineering and Analytical Science of the University of Manchester. The aim of this project is to carry out the techno-economic assessment of the integrated calcium and chemical looping process using the gases from the primary steelwork and compare it with existing processes. The project combines numerical modelling and process design integration using software such as Aspen Plus. The project is initially for 2 years with the possibility to extend the contract for additionally 2 more years.

You should already hold or be nearing completion of a PhD/DPhil in chemical engineering, energy engineering, focused on reactor design and process development with proven experience in advanced reactor modelling, knowledge on gas-solid reactions and catalysis. Previous experience on chemical and calcium looping technology are desirable and particularly welcome.

Key Responsibilities, Accountabilities or Duties

- Be involved in the assessment of student knowledge and supervision of projects.
- Develop research objectives and proposals for own or joint research, with the assistance of a mentor if required.
- Conduct individual and collaborative research projects.
- Write up research work for publication.
- Continually update knowledge and understanding in field or specialism.
- Translate knowledge of advances in the subject area into research activity.
- Communicate complex information, orally, in writing and electronically.
- Communicate material of a specialist or highly technical nature.
- Liaise with colleagues and students.
- Build internal contacts and participate in internal networks for the exchange of information and to form relationships for future collaboration.
- Join external networks to share information and identify potential sources of funds.
- Manage own research and administrative activities, with guidance if required.
- Work with colleagues on joint projects, as required
- Collaborate with academic colleagues on areas of shared research interest.
- Attend and contribute to relevant meetings.

- Use new research techniques and methods.
- Use creativity to analyse and interpret research data and draw conclusions on the outcomes.
- Contribute to collaborative decision making with colleagues in areas of research.
- Use research resources, laboratories and workshops as appropriate.
- Plan and manage own research activity in collaboration with others.
- Be aware of the risks in the work environment and their potential impact on their own work and that of others.

PERSON SPECIFICATION

Essential Knowledge, Skills and Experience

- Have, or be about to obtain, a relevant PhD (or equivalent).
- Specialist knowledge in the discipline of chemical engineering, process integration, reactor engineering.
- Experience in chemical process simulation and optimisation.
- Excellent communication and interpersonal skills.
- Excellent time management and organisational skills.
- Ability to work independently and as part of a team.
- Ability to present in both written and oral publications.
- Ability to liaise confidently and effectively with a range of individuals.
- Flexible approach to dealing with research problems as they arise.
- Willingness to learn and develop.
- Ability to meet deadlines.
- Strong journal publication record.
- The ability to evaluate complex data.
- Ability to contribute to broader management and administrative processes.
- Ability to assess and organise resources.
- Understand equal opportunity issues as they may impact on areas of research content.